

Problem Set #5

Physics 302

Tuesday, 27 February 2024

The following problems come from *Vibrations and Waves* (1971), by AP French.

- Problem 4-2 on page 112 \Rightarrow (10 points) Go through the same steps we went through in class. Once you understand that it makes no difference whether a cosine or sine is used for the driving force, you will be in a good position to understand Fourier analysis.
- Problem 4-3 on page 112 \Rightarrow (10 points) Having done Problem 4-2, part (b) of this problem is straightforward.
- Problem 4-4 on pages 112-113 \Rightarrow (20 points) Make a nice *Mathematica* plot for part (e). Scale x by A and t by $\sqrt{h/g}$ so that the plot uses only dimensionless quantities.
- Problem 4-5 on page 113 \Rightarrow (20 points) Make a nice, big sketch for part (a). Use the fact that $\theta \ll 1$ and work in Cartesian coordinates, just like we did in class when we first examined the simple pendulum. Once you've got the differential equation, you will have an equation that we've already solved. There is no need to reinvent the wheel; just state the complete answer. Part (c) has a little bit of algebra in it. Don't do any expansions until *after* you've solved a quadratic equation. Only then can you make use of the fact that $Q \gg 1$.

Due date: **Thursday, 07 March 2024** (*beginning of class*)